

We claim:

1. A method of processing sewage comprising:
introducing the sewage to the bottom of a fermentation cell designed for sedimentation and methane fermentation of settleable organic solids, the fermentation cell further having sulfate-reducing microorganisms that release sulfides for combining with multivalent metal ions in the sewage to form insoluble and settleable metal sulfide particles;
removing suspended solids, microorganisms, nutrients, and pathogens from the sewage to produce a disinfected quaternary effluent; and
from the disinfected quaternary effluent, producing purified water from the disinfected quaternary effluent, wherein the purified water is substantially free of multivalent metal particles.
2. The method of claim 1 further comprising producing a brine having concentrated minerals from the disinfected quaternary effluent, wherein the brine is substantially free of multivalent metal particles.
3. The method of claim 2 wherein the producing step comprises a step of performing reverse osmosis on the disinfected quaternary effluent to produce the purified water and the brine.
4. The method of claim 1 further comprising passing effluent from the fermentation cell to a primary facultative pond having microorganisms therein, wherein the microorganisms have a negative surface charge for adsorbing multivalent metal ions in the effluent.
5. The method of claim 4 wherein the microorganisms shift the pH of the effluent to precipitate calcium ions from the effluent.
6. The method of claim 4 wherein the microorganisms comprise algae.
7. The method of claim 1 wherein the removing step comprises a Dissolved Air Flotation process and a Slow Sand Filtration process.
8. The method of claim 1 wherein the removing step comprises a Dissolved Air Flotation process and a microfiltration process.

9. The method of claim 1 further comprising, before the introducing step, removing non-biodegradable solids from the sewage for separate disposal.

10. A method of cultivating algae, comprising:

removing non-biodegradable solids from sewage for separate disposal;

after the removing step, introducing the sewage to the bottom of a fermentation cell designed to optimize sedimentation and methane fermentation of settleable organic solids, the fermentation cell having sulfate-reducing organisms that release sulfides for combining with multivalent metal particles in the sewage to form insoluble and settleable metal sulfide particles;

after the introducing step, passing the sewage from the fermentation cell to an overlaying primary facultative pond containing microorganisms, wherein the microorganisms have a negative surface charge for adsorbing multivalent metal ions in the sewage;

after the passing step, removing suspended solids, microorganisms, nutrients, and pathogens from the sewage to produce a disinfected quaternary effluent;

performing reverse osmosis on the disinfected effluent to produce a high salinity concentrate that is substantially free of multivalent metal particles; and

cultivating halophilic microorganisms in the high salinity concentrate.

12. The method of claim 12 wherein the halophilic microorganisms comprise *Dunaliella*.

13. A method of treating and reclaiming wastewater, comprising:

introducing the wastewater to the bottom of a fermentation cell designed to optimize sedimentation and methane fermentation of settleable organic solids, the fermentation cell having sulfate-reducing organisms that release sulfides for combining with multivalent metal particles in the wastewater to form insoluble and settleable metal sulfide particles;

after the introducing step, passing the wastewater from the fermentation cell to an overlaying primary facultative pond containing microorganisms, wherein the microorganisms have a negative surface charge for adsorbing multivalent metal ions in the wastewater;

after the passing step, removing suspended solids, microorganisms, nutrients, and pathogens in the sewage to produce a disinfected quaternary effluent.